

WHAT IS CLAIMED IS:

1. A digital camera that creates an image signal
through catching a subject light, the digital camera
5 comprising:

an image taking lens, which is variable in a focal
length, comprising three groups of a first lens group, a
second lens group, and a third lens group in the named
order with respect to an optical axis direction;

10 a lens barrel that incorporates therein the image
taking lens, having in front an aperture through which the
image taking lens appears and having in rear an internal
space defined by a wall, the lens barrel being free in
extension and collapse and performing a focal length
15 control; and

a solid state imaging device that receives the
subject light formed by the image taking lens to create the
image signal, the solid state imaging device being
supported by the wall,

20 wherein the lens barrel has:

a second lens group advancing and saving mechanism
in which at the time of the collapse of the lens barrel,
the second lens group is saved to a second lens group
saving position out of an optical axis of the image taking
25 lens, and at the time of the extension of the lens barrel,
the second lens group is advanced onto the optical axis of
the image taking lens; and

a third lens group advancing and saving mechanism in which at the time of the collapse of the lens barrel, the third lens group is saved to a third lens group saving position out of the optical axis of the image taking lens, and at the time of the extension of the lens barrel, the third lens group is advanced onto the optical axis of the image taking lens.

2. A digital camera according to claim 1, wherein the digital camera further comprises a focusing mechanism wherein a focusing is performed by a movement of the third lens group in the optical axis direction.

3. A digital camera according to claim 1, wherein the lens barrel has:

a second lens group guide frame that moves in the optical axis direction in accordance with the extension, the collapse and the focal length control so as to determine a position related to the optical axis direction of the second lens group; and a second lens group holding frame that holds the second lens group and is pivotally supported by the second lens group guide frame, the second lens group holding frame causing the second lens group to revolve on the optical axis of the image taking lens at the time of the extension, and the second lens group holding frame causing the second lens group to revolve on the second lens group saving position at the time of the

collapse, and

wherein the lens barrel has:

5 a third lens group guide frame that moves in the optical axis direction in accordance with the extension, the collapse and the focusing so as to determine a position related to the optical axis direction of the third lens group; and a third lens group holding frame that holds the third lens group and is pivotally supported by the third lens group guide frame, the third lens group holding frame causing the third lens group to revolve on the optical axis of the image taking lens at the time of the extension, and the third lens group holding frame causing the third lens group to revolve onto the third lens group saving position at the time of the collapse.

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4. A digital camera according to claim 3, wherein the second lens group holding frame is enabled in a direction that the second lens group is revolved on the optical axis of the image taking lens,

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the wall has a revolving affecting section having a geometry projecting into the internal space, the revolving affecting section being in contact with the second lens group holding frame at the time of the collapse to affect revolving of the second lens group holding frame, and

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the second lens group holding frame has an affect receiving section that is pushed by the revolving affecting

section at the time of the collapse so that the second lens group revolves into the second lens group saving position.

5. A digital camera according to claim 4, wherein the second lens group holding frame causes the second lens group to advance onto the optical axis of the image taking lens by affect of the enabling, at the time of the extension, in such a manner that the affect receiving section is separated from the revolving affecting section.

6. A digital camera according to claim 4, wherein the revolving affecting section has a taper on the top, and the affect receiving section causes the second lens group to be saved from the optical axis of the image taking lens to the second lens group saving position through revolving by means of pushing by the taper of the revolving affecting section, at the time of the collapse.

7. A digital camera according to claim 3, wherein the third lens group holding frame is enabled in a direction that the third lens group is revolved on the optical axis of the image taking lens,

the wall has a revolving affecting section having a geometry projecting into the internal space, the revolving affecting section being in contact with the third lens group holding frame at the time of the collapse to affect revolving of the third lens group holding frame, and

the third lens group holding frame has an affect receiving section that is pushed by the revolving affecting section at the time of the collapse so that the third lens group revolves into the third lens group saving position.

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8. A digital camera according to claim 7, wherein the third lens group holding frame causes the third lens group to advance onto the optical axis of the image taking lens by affect of the enabling, at the time of the extension, in such a manner that the affect receiving section is separated from the revolving affecting section.

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9. A digital camera according to claim 7, wherein the affect receiving section is an object shaped as a plate moving to the wall side while rotating around the periphery of the revolving affecting section through pushing by the revolving affecting section, at the time of the collapse, the object shaped as a plate being inclined with respect to the optical axis.

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10. A digital camera according to claim 7, wherein the revolving affecting section has a taper on the top, and

the affect receiving section causes the third lens group to be saved from the optical axis of the image taking lens to the third lens group saving position through revolving by means of pushing by the taper of the revolving

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affecting section, at the time of the collapse.

11. A digital camera according to claim 3,
wherein the solid state imaging device being disposed at a
5 position projecting from the wall to the internal space and
being supported by the wall, and

the second lens group holding frame and the third
lens group holding frame cause the second lens group and
the third lens group to revolve onto the second lens group
10 saving position set up to a hollow portion divided by the
solid state imaging device and the wall beside the solid
state imaging device and the third lens group saving
position, respectively, at the time of the collapse.

12. A digital camera according to claim 3,
wherein the second lens group holding frame and the third
lens group holding frame cause the second lens group and
the third lens group to revolve onto the second lens group
saving position and the third lens group saving position
20 set up to positions beside the first lens group,
respectively, at the time of the collapse, wherein there is
defined a plane vertical to the optical axis, which crosses,
at the time of the collapse, the first lens group, the
second lens group and the third lens group.

13. A digital camera according to claim 3,
wherein the second lens group holding frame and the third

lens group holding frame have their centers of rotatable movement with respect to the second lens group guide frame and the third lens group guide frame at mutually opposite positions with respect to the optical axis.

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14. A digital camera according to claim 1, wherein the digital camera further comprises a light quantity control member that moves in one united body together with the second lens group in the optical axis direction of the image taking lens stored in the lens barrel to control a light quantity of the subject light passing through the image taking lens, and

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the second lens group advancing and saving mechanism provides such a performance that at the time of the collapse of the lens barrel, the light quantity control member is saved in one united body together with the second lens group to the rear elements saving position, and at the time of the extension of the lens barrel, the light quantity control member is advanced in one united body together with the second lens group onto the optical axis of the image taking lens.

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15. A digital camera according to claim 1, wherein the digital camera further comprises a light quantity control member that moves in one united body together with the third lens group in the optical axis direction of the image taking lens stored in the lens

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barrel to control a light quantity of the subject light passing through the image taking lens, and

the third lens group advancing and saving mechanism provides such a performance that at the time of the collapse of the lens barrel, the light quantity control member is saved in one united body together with the third lens group to the third lens group saving position, and at the time of the extension of the lens barrel, the light quantity control member is advanced in one united body together with the third lens group onto the optical axis of the image taking lens..

16. A digital camera according to claim 14, wherein the light quantity control member consists of an electrooptical element.

17. A digital camera according to claim 15, wherein the light quantity control member consists of an electrooptical element.

18. A digital camera according to claim 14, wherein the light quantity control member is an aperture member that controls an aperture caliber to control the subject light passing through the image taking lens.

19. A digital camera according to claim 15, wherein the light quantity control member is an aperture

member that controls an aperture caliber to control the subject light passing through the image taking lens.

20. A digital camera according to claim 14,
5 wherein the light quantity control member is a shutter member that controls a shutter speed to control the subject light passing through the image taking lens.

21. A digital camera according to claim 15,
10 wherein the light quantity control member is a shutter member that controls a shutter speed to control the subject light passing through the image taking lens.

22. A digital camera according to claim 1,
15 wherein the digital camera further comprises first and second light quantity control members that moves in one united body together with the second lens group and the third lens group in the optical axis direction of the image taking lens stored in the lens barrel to control a light
20 quantity of the subject light passing through the image taking lens, respectively, and

the second lens group advancing and saving mechanism provides such a performance that at the time of the collapse of the lens barrel, the first light quantity
25 control member is saved in one united body together with the second lens group to the rear elements saving position, and at the time of the extension of the lens barrel, the

first light quantity control member is advanced in one united body together with the second lens group onto the optical axis of the image taking lens, and

the third lens group advancing and saving
5 mechanism provides such a performance that at the time of the collapse of the lens barrel, the second light quantity control member is saved in one united body together with the third lens group to the third lens group saving position, and at the time of the extension of the lens
10 barrel, the second light quantity control member is advanced in one united body together with the third lens group onto the optical axis of the image taking lens.

23. A digital camera according to claim 19,
15 wherein at least one of the first and second light quantity control members consists of an electrooptical element.

24. A digital camera according to claim 19,
wherein one and another are an aperture member that
20 controls an aperture caliber to control the subject light passing through the image taking lens, and a shutter member that controls a shutter speed to control the subject light passing through the image taking lens.

25. A digital camera according to claim 20,
wherein one and another are an aperture member that
controls an aperture caliber to control the subject light

passing through the image taking lens, and a shutter member that controls a shutter speed to control the subject light passing through the image taking lens.

5 26. A digital camera that creates an image signal through catching a subject light, the digital camera comprising:

an image taking lens, which is variable in a focal length, comprising three groups of a front elements lens, a rear elements lens, and a focus lens in the named order
10 with respect to an optical axis direction, wherein a focusing is performed by a movement of the focus lens;

a lens barrel that incorporates therein the image taking lens, having in front an aperture through which the
15 image taking lens appears and having in rear an internal space defined by a wall, the lens barrel being free in extension and collapse and performing a focal length control; and

a solid state imaging device that receives the
20 subject light formed by the image taking lens to create the image signal, the solid state imaging device being supported by the wall,

wherein the lens barrel has:

a rear elements lens advancing and saving
25 mechanism in which at the time of the collapse of the lens barrel, the rear elements lens is saved to a rear elements lens saving position out of an optical axis of the image

taking lens, and at the time of the extension of the lens barrel, the rear elements lens is advanced onto the optical axis of the image taking lens; and

a focus lens advancing and saving mechanism in which at the time of the collapse of the lens barrel, the focus lens is saved to a focus lens saving position out of the optical axis of the image taking lens, and at the time of the extension of the lens barrel, the focus lens is advanced onto the optical axis of the image taking lens.

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27. A digital camera according to claim 26, wherein the lens barrel has:

a rear elements guide frame that moves in the optical axis direction in accordance with the extension, the collapse and the focal length control so as to determine a position related to the optical axis direction of the rear elements lens; and a rear elements holding frame that holds the rear elements lens and is pivotally supported by the rear elements guide frame, the rear elements holding frame causing the rear elements lens to revolve on the optical axis of the image taking lens at the time of the extension, and the rear elements holding frame causing the rear elements lens to revolve on the rear elements lens saving position at the time of the collapse, and

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wherein the lens barrel has:

a focus lens guide frame that moves in the optical

axis direction in accordance with the extension, the collapse and the focusing so as to determine a position related to the optical axis direction of the focus lens; and a focus lens holding frame that holds the focus lens
5 and is pivotally supported by the focus lens guide frame, the focus lens holding frame causing the focus lens to revolve on the optical axis of the image taking lens at the time of the extension, and the focus lens holding frame causing the focus lens to revolve onto the focus lens
10 saving position at the time of the collapse.

28. A digital camera according to claim 27, wherein the solid state imaging device being disposed at a position projecting from the wall to the internal space and
15 being supported by the wall, and

the rear elements holding frame and the focus lens holding frame cause the rear elements lens and the focus lens to revolve onto the rear elements lens saving position set up to a hollow portion divided by the solid state
20 imaging device and the wall beside the solid state imaging device and the focus lens saving position, respectively, at the time of the collapse.

29. A digital camera according to claim 27,
25 wherein the rear elements holding frame and the focus lens holding frame cause the rear elements lens and the focus lens to revolve onto the rear elements lens saving position

and the focus lens saving position set up to positions
beside the front elements lens, respectively, at the time
of the collapse, wherein there is defined a plane vertical
to the optical axis, which crosses, at the time of the
5 collapse, the front elements lens, the rear elements lens
and the focus lens.

30. A digital camera according to claim 27,
wherein the rear elements holding frame and the focus lens
10 holding frame have their centers of rotatable movement with
respect to the rear elements guide frame and the focus lens
guide frame at mutually opposite positions with respect to
the optical axis.

15 31. A digital camera according to claim 26,
wherein the digital camera further comprises a light
quantity control member that moves in one united body
together with the rear elements lens in the optical axis
direction of the image taking lens stored in the lens
20 barrel to control a light quantity of the subject light
passing through the image taking lens, and

the rear elements lens advancing and saving
mechanism provides such a performance that at the time of
the collapse of the lens barrel, the light quantity control
25 member is saved in one united body together with the rear
elements lens to the rear elements saving position, and at
the time of the extension of the lens barrel, the light

quantity control member is advanced in one united body together with the rear elements lens onto the optical axis of the image taking lens.

5 32. A digital camera according to claim 26,
wherein the digital camera further comprises a light
quantity control member that moves in one united body
together with the focus lens in the optical axis direction
of the image taking lens stored in the lens barrel to
10 control a light quantity of the subject light passing
through the image taking lens, and

the focus lens advancing and saving mechanism
provides such a performance that at the time of the
collapse of the lens barrel, the light quantity control
15 member is saved in one united body together with the focus
lens to the focus lens saving position, and at the time of
the extension of the lens barrel, the light quantity
control member is advanced in one united body together with
the focus lens onto the optical axis of the image taking
20 lens.

25 33. A digital camera according to claim 26,
wherein the digital camera further comprises first and
second light quantity control members that moves in one
united body together with the rear elements lens and the
focus lens in the optical axis direction of the image
taking lens stored in the lens barrel to control a light
quantity of the subject light passing through the image

taking lens, respectively, and

the rear elements lens advancing and saving mechanism provides such a performance that at the time of the collapse of the lens barrel, the first light quantity control member is saved in one united body together with the rear elements lens to the rear elements saving position, and at the time of the extension of the lens barrel, the first light quantity control member is advanced in one united body together with the rear elements lens onto the optical axis of the image taking lens, and

the focus lens advancing and saving mechanism provides such a performance that at the time of the collapse of the lens barrel, the second light quantity control member is saved in one united body together with the focus lens to the focus lens saving position, and at the time of the extension of the lens barrel, the second light quantity control member is advanced in one united body together with the focus lens onto the optical axis of the image taking lens.